REMARKS

Claim 17 is objected to because of the redundant word "rotating" in line 6. The redundant word has been deleted.

Claims 29-33, 35, 36, 70-75, 77 and 78 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,323,052 to Finarov. The rejection is respectfully traversed as applied to the claims presently standing.

Claim 29 has been amended to clarify that the providing provides a beam of polarized radiation having a linearly polarized component. Radiation from the beam is then modulated before modification by the sample by means of a rotating polarizing element. Such features are not taught or suggested by Finarov. In the summary of the invention of Finarov in column 2, lines 23-25, it is stated that "a polarizer is disposed in the optical axis between the source and the object for linearly polarizing the incident light." Therefore, in Finarov, the light source 10 provides unpolarized light which is linearly polarized by polarizer 15 and then passes through a phase compensator 16 before the light reaches the sample or article 12. In contrast, in claim 29, the beam that is polarized by a rotating polarizing element is already polarized to begin with and has a linearly polarized component.

By providing a beam of polarized radiation having a linearly polarized component and then modulating radiation from such beam by means of a rotating polarizing element, much more information can be obtained in the measurement. Thus, as the polarizing element is rotated, the linearly polarized component in the polarized beam will be at different angles relative to the polarizing axis of the rotating polarizing element, so that the intensity of the linearly polarized component that is passed through the rotating polarizing element is modulated over time. In contrast, since the beam from light source 10 supplied to the rotating

LAW OFFICES OF
SKJERVEN MORRILL LLP
3 EMBARCADERO CENTER
SUITE 2800
SAN FRANCISCO, CA 94111
(415) 217-6000
FAX (415) 434-0646

polarizer 15 in Finarov is unpolarized, the amplitude of the beam from source 10 is not modulated over time when polarizer 15 is rotated. Consequently, Finarov can only obtain much less information in the measurement compared to the invention of claim 29. There is therefore no identity of elements between Finarov and claim 29.

It is believed to be well settled that for a reference to anticipate a claim, there must be identity of elements between the elements of the reference and those of the claim. For the reasons given above, Finarov fails this test and therefore fails to anticipate claim 29.

The system described by Finarov is directed to a technology known as null ellipsometry. In this technology, either a polarizer in the illumination path, a compensator, or an analyzer in the detection path is rotated until the signal detected is minimized. In the null ellipsometer of Finarov, the ellipsometric parameters are calculated from the angular positions of the three components: polarizer 15, compensator 16 and analyzer 17. Col. 7, lines 12-14. In contrast, in claim 29, the ellipsometric parameters of the sample are derived, not from any angular positions of the optical elements in the system, but from the radiation detected from the beam that has been modulated by the sample. The invention of claim 29 therefore belongs to a very different type of ellipsometer compared to the null ellipsometer of Finarov. As pointed out above, the method of claim 29 is able to derive much more information compared to Finarov.

In view of the vast differences between the two kinds of ellipsometers and their different construction, it is believed that there is no reason or motivation to modify the null ellipsometer of Finarov to arrive at a system resembling that of claim 29. Claim 29 is therefore believed to be non-obvious over Finarov and is therefore believed to be allowable.

LAW OFFICES OF
SKJERVEN MORRILL LLP
3 EMBARCADERO CENTER
SUITE 2800
SAN FRANCISCO, CA 94111
(415) 217-6000
FAX (415) 434-0646

For the same reasons as those explained above, claim 70 is likewise believed to be allowable.

Claims 30-33, 35, 36, 71-75, 77 and 78 are believed to be allowable since they depend from allowable claims. They are further believed to be allowable on the ground of the features added in these claims. Thus, claim 32 adds the limitation that the providing step comprises passing unpolarized radiation through a fixed linear polarizer which is different from the rotating polarizer modulating radiation from the output of the fixed linear polarizer. This is clearly not taught or suggested by Finarov. Column 6, lines 55-65, merely refers to the passing of unpolarized radiation from light source 10 to a rotating polarizer 15 and does not teach or suggest the feature of claim 32. The same is true for claim 73.

It is believed to be well known to those skilled in the art that high accuracy is required of instruments such as ellipsometers and that it is a common assumption that unless ellipsometers are properly calibrated, they cannot be used for measurement. On pages 1 and 2 of the specification, for example, it is noted that "Ellipsometric measurements are affected by the environment such as temperature changes and mechanical vibrations. For this purpose, ellipsometers are calibrated periodically to account for such environmental effects." This is the case whether or not calibration reference samples are used in the calibration process.

Even where thin film reference samples are used in the calibration process, however, minimal oxidation or contamination of the reference samples can cause significant calibration errors. This requires the reference sample, therefore, to be calibrated by means of a calibration ellipsometer each time a thin film optical measurement system is to be operated for measurement so that the entire procedure may become very cumbersome. If the measurement system is not used immediately after calibration to perform the measurement, the film or films on the reference sample may have changed between the time of calibration

LAW OFFICES OF
SKJERVEN MORRILL LLP
3 EMBARCADERO CENTER
SUITE 2800
SAN FRANCISCO, CA 94111
(415) 217-6000
FAX (415) 434-0646

and the time of measurement. By providing measurement systems with self-calibrating capability, such as those in claim 35, the above-described problems can be avoided altogether.

Claim 35 adds the limitation that the deriving step derives one or more parameters of the polarizing element, the polarizer or of a system used in the providing, detecting or modulating step. This means that errors introduced by inaccuracies of the measurement system can be compensated for by the knowledge of the parameters of the components of the measurement system derived from the same measurement that is used to measure the actual sample (and not a reference sample). Hence, the system does not need to be calibrated first prior to the measurement; this speeds up the measurement process significantly. This allows the system that is used in performing the method of claim 35 to avoid having to be calibrated with respect to the polarizing element, the polarizer or of a system used in the providing, detecting or modulating step. The above-described feature of the invention is known as self-calibration and is important, as explained above. This is clearly not taught or suggested by Finarov. Finarov simply contains no disclosure concerning any self-calibration capabilities. Column 4, lines 55-65, of Finarov discloses no such feature. In contrast, according to claim 35, the deriving step is able to derive parameters concerning the optical component(s) used in the measurement of ellipsometric parameters in the same measurement process. This feature is clearly not taught or suggested by Finarov. The same is true for claim 77.

As noted above, Finarov clearly does not teach or suggest the feature of claim 36. It is believed to be a well known assumption to those skilled in the art that unless ellipsometers are properly calibrated, they cannot be used for measurement. In the rejection of claims 36 and 78, the Examiner is of the opinion that, since the system of Finarov is "not calibrated" and the ellipsometric parameters are determined referring to column 7, lines 50-52, Finarov teaches claims 36 and 78. Applicants respectfully disagree. The fact that Finarov fails to mention

LAW OFFICES OF
SKJERVEN MORRILL LLP
3 EMBARCADERO CENTER
SUITE 2800
SAN FRANCISCO, CA 94111
(415) 217-6000
FAX (415) 434-0646

any calibration does not mean that Finarov's ellipsometer does not need to be calibrated. In fact, for an accurate determination of the angular positions γ_P, γ_A, γ_C of the polarizer, analyzer and compensator, Finarov's system needs to be calibrated. If Finarov's ellipsometer is uncalibrated, it is simply not useable for measuring ellipsometric parameters, as known to those skilled in the art. For these reasons, claims 36 and 78 add features which are not taught or suggested by Finarov. If the examiner disagrees, it is respectfully requested that a detailed explanation and factual support be provided for the rejection.

Claims 90-94, 107-111 are rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent 5,900,939. The rejection is respectfully traversed as applied to the rejected claims presently standing.

As amended, claim 90 now includes deriving from information in the first signals parameters of the sample and of the ellipsometer. The first signals are obtained by measuring a sample by means of an ellipsometer. This means that it is possible for the ellipsometer measurement results to not only yield information on parameter(s) of the sample but also one or more parameters of the ellipsometer. This is not possible in the '939 patent. As clearly explained in the paragraph beginning at column 2, line 53 through column 3, line 11 of the '939 patent, the calibration reference ellipsometer of such patent requires the use of a reference sample that has at least a partially known composition and that the calibration reference ellipsometer employs a light generator having a known wavelength and a known polarization for interaction with the reference sample. The calibration reference ellipsometer is then used to measure the optical properties of the reference sample based on the known polarization state, wavelength of light from the light generator and the at least partially known composition of the reference sample. The reference sample is then used for calibrating other optical measurement devices by using such devices to measure the same reference sample.

LAW OFFICES OF
SKJERVEN MORRILL LLP
3 EMBARCADERO CENTER
SUITE 2800
SAN FRANCISCO, CA 94111
(415) 217-6000
FAX (415) 434-0646

The processor then calibrates the other optical measurement devices by comparing the measured optical parameters from such devices to those determined by using the calibration reference ellipsometer.

Thus, from the above, it is clear that the calibration reference ellipsometer of the '939 patent cannot be used for calibration without prior knowledge of a reference sample and of the polarization and wavelength of the light source. In contrast, in the method of claim 90, there is no prior knowledge required of any reference samples, and it is possible by measuring an unknown sample to determine both the parameter(s) of the sample and parameter(s) of the ellipsometer. Furthermore, in the system of the '939 patent, the parameters of the calibration reference ellipsometer are not derived, and those of the optical measurement devices are derived only by means of the elaborate calibration process described above. In other words, it is not possible for the system of the '939 patent to self-calibrate. Therefore, the '939 patent fails to teach or suggest the feature of claim 90 whereby by making a measurement of an unknown sample, it is possible to derive parameter(s) of the ellipsometer itself. If anything, it teaches away from such self-calibration feature.

For the reasons above, it is believed that there is no identity of elements between claim 90 and the '939 patent and further that claim 90 is non-obvious over such patent. For substantially the same reasons, it is believed that claim 107 is patentable over the '939 patent.

Claims 91-94 and 108-111 are believed to be allowable since they depend from allowable claims.

Claims 1-3, 9, 11-16, 37-39, 46, 48, 49, 51-53 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Finarov in view of U.S. Patent 5,581,350 to Chen et al. The rejection is respectfully traversed

LAW OFFICES OF
SKJERVEN MORRILL LLP
3 EMBARCADERO CENTER
SUITE 2800
SAN FRANCISCO, CA 94111
(415) 217-6000
FAX (415) 434-0646

At the top of page 7 of the office action, the Examiner admits that Finarov differs from the claimed invention and the rejected claims in that system parameters are not derived. However, the Examiner is of the opinion that to do so is well known as taught by Chen et al. Applicants respectfully disagree.

In the method of claim 1, one or more ellipsometric parameters of the sample and one or more parameters of a system used in the providing, detecting or modulating step are derived from the detected radiation. In other words, from the same measurement of an unknown sample, it is possible to derive, from the detected radiation, both ellipsometric parameters of the sample as well as one or more parameters of the measurement system. In other words, an uncalibrated ellipsometer can be used for measuring the parameters of a sample and of the ellipsometer itself. This is not taught or suggested by Finarov and Chen at al., either in combination or individually.

Finarov describes a null ellipsometer for measuring properties of samples. Chen et al. describes a system for calibrating ellipsometers. Neither one reference teaches or suggests the possibility of self-calibration, namely, that the same measurement that is used for determining properties of the sample will also yield parameter(s) about the measurement system itself. Finarov is simply silent on this entire subject. Chen et al. itself does not teach or suggest that an uncalibrated ellipsometer can be used for both measuring the sample and calibrating at the ellipsometer in the same measurement. While Chen et al. describes a system for calibrating an ellipsometer, the clear implicit assumption underlying Chen's disclosure is that a calibration of the ellipsometer is necessary before the ellipsometer can be used in measuring samples. As noted above, it is a well known assumption to those skilled in the ellipsometry art that an uncalibrated ellipsometer cannot be used for measuring samples. Therefore, it is

LAW OFFICES OF
SKJERVEN MORRILL LLP
3 EMBARCADERO CENTER
SUITE 2800
SAN FRANCISCO, CA 94111
(415) 217-6000
FAX (415) 434-0646

believed that Finarov and Chen et al., together or individually, do not teach or suggest the invention of claim 1.

Furthermore, the Examiner has failed to provide a reason or motivation for combining Finarov and Chen et al. The subject matter of the two patents is distinct from each other, and neither one suggests combination with the other. Even if one were to combine Finarov with Chen et al., one would merely obtain a system where an ellipsometer is first calibrated by means of the system of Chen et al. in an initial calibration measurement process, and then after the ellipsometer has been so calibrated, the ellipsometer is then used as taught by Finarov in an entirely separate subsequent measurement process to measure the sample. Thus, even if one were to combine Finarov and Chen et al., one still would not obtain the invention of claim 1, where the same measurement process yields both the ellipsometric parameters of the sample and one or more parameters of the measurement system, so that the two-step process (ellipsometer calibration followed by sample measurement) is avoided altogether.

For the reasons above, it is believed that claim 1 is allowable over Finarov and Chen et al. and any other art of record. For the same reasons, claim 37 is also believed to be allowable. Claims 2, 3, 9, 11-16, 38, 39, 46, 48, 49 and 51-53 are believed to be allowable since they depend from allowable claims. They are further believed to be allowable on the ground of features added therein. The features of claims 14 and 52 are discussed below. Thus, claim 16 adds the limitation that the deriving derives parameters of the system such that the ellipsometric parameters are accurately derived without calibration of the system. As explained above, both Finarov and Chen et al. fail to teach or suggest such feature. Claim 53 adds a limitation similar to claim 16. For reasons similar to those above for claim 29, claims 38 and 39 are believed to be allowable.

LAW OFFICES OF
SKJERVEN MORRILL LLP
3 EMBARCADERO CENTER
SUITE 2800
SAN FRANCISCO, CA 94111
(415) 217-6000
FAX (415) 434-0646

Claims 4-8, 40-44 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Finarov, Chen et al. and further in view of U.S. Patent 3,985,447 ("the '447 patent"). The rejection is respectfully traversed.

The above-described features of claims 1 and 37 are also not taught or suggested by the '447 patent to Aspnes. Therefore, claims 4-8 and 40-44 are believed to be allowable since they depend from allowable claims 1 and 37. They are further believed to be allowable on the strength of limitations added by these claims. Thus, claims 5 and 41 add the feature that the modulating step rotates the modulator or polarizer by more than 13 complete revolutions while the detecting step is detecting radiation from the beam. As clearly explained in the specification on page 20, lines 2-5, in order to obtain adequate detector information to derive the 25 harmonics, it is desirable for at least one of the two modulators or polarizers to be rotated by more than 13 revolutions so that adequate information may be obtained to perform the self-calibration of the measurement instrument. The Examiner is of the view that this is obvious since "It has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable range involves only routine skill." Top of page 10 of the office action. In this instance, none of the three references teaches or suggests self-calibration so that they fail to teach or suggest the general conditions of the claim. Applicants also disagree with the Examiner's quoted statement as too broad and sweeping. It is respectfully requested that the Examiner provide the legal foundation for such statement which is believed to be required for the Examiner to provide a *prima facie* case of obviousness. This approach by the examiner is opposite to the one required by the Federal Circuit in the case In re Sang Su Lee, 277 F.3d 1338, 61 U.S.P.Q.2d 1430 (Fed. Cir. Jan. 2002).

In such case, the Federal Circuit, quoted In re Dembiczak, 175 F.3d 994, 999, 50 U.S.P.Q.2d 1614, 1617 (Fed. Cir. 1999) as follows: "Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references." The Federal Circuit went on to state that "The need for specificity pervades this authority . . . . The Examiner's conclusory statements . . . do not adequately address the issue of motivation to combine. This factual question of motivation is

LAW OFFICES OF
SKJERVEN MORRILL LLP
3 EMBARCADERO CENTER
SUITE 2800
SAN FRANCISCO, CA 94111
(415) 217-6000
FAX (415) 434-0646

material to patentability, and could not be resolved on subjective belief and unknown authority."

It is submitted that the examiner's rejection of claim 5 is apparently based on subjective belief and unknown authority. The same can be said for claim 41.

Claims 6 and 42 add the feature that the modulator and polarizer are rotated at two speeds that form the ratio of two integers where each of the integers is indivisible by the other. This is not taught or suggested by any one of the three references, either individually or in combination. Thus, as clearly explained on page 19, lines 28-30, of the specification of the present application, the feature of claim 6 is useful for deriving 25 harmonics for self-calibration. Aspnes in the '447 patent describes a system where the analyzer is rotated at three times the speed of the compensator which means the rotation speeds of the analyzer and compensator are divisible one by the another. This is exactly the opposite of the feature that is claimed in claim 6. The Examiner has failed to articulate a reason or motivation for modifying such feature of Aspnes in order to arrive at the opposite feature claimed in claim 6. As clearly explained on page 19, lines 25-28, of the specification, "Where the speed of rotation of one polarizer or modulator is an integral multiple of the speed of rotation of the other in the pair, there may not be adequate information for all 25 harmonics to be derived from the detector signal."

Claims 41 and 42 add limitations similar to claims 5 and 6.

Claims 10 and 47 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Finarov, Chen et al. and further in view of U.S. Patent 5,018,863 to Vareille et al. The rejection is respectfully traversed. Claims 10 and 47 depend from claims 1 and 37. Since Vareille et al. fails to teach or suggest claims 1 and 37, claims 10 and 47 are believed to be allowable since they depend from allowable claims.

LAW OFFICES OF
SKJERVEN MORRILL LLP
3 EMBARCADERO CENTER
SUITE 2800
SAN FRANCISCO, CA 94111
(415) 217-6000
FAX (415) 434-0646

Claims 34 and 76 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Finarov. The rejection is respectfully traversed. It is noted that Finarov employs lenses in implementing the system (e.g., imaging lens 71 and 63b in Fig. 4). As known to those skilled in the art, the use of lenses in focusing ultraviolet radiation at the short end of the claimed wavelength range of 150 to about 830 nanometers would cause unacceptable aberration. Therefore, it is believed that Finarov fails to teach or suggest the features added by claims 34 and 76. Furthermore, the only rationale given by the Examiner in support of the rejection is the same broad, sweeping statement (the sentence bridging pages 10 and 11 of the office action) which is believed to have no legal foundation. The Examiner is requested to supply the legal foundation for such rationale. For similar reasons, claims 14, 26 and 52 are also believed to be allowable.

The Examiner rejected claims 45 and 79 as being unpatentable over Finarov and Chen et al. in view of U.S. Patent No. 5,544,581 to Nagata et al. The rejection is respectfully traversed. Claims 45 and 79 depend from claims 37 and 70 and are allowable since they depend from allowable claims. Nagata et al. also fails to teach or suggest the self-calibrating feature of claim 37 and the features of claim 70 discussed above.

Nagata et al. discloses a system for measuring birefringence in a material such as plastic. The phase plate 36 is used by Nagata et al. to maximize the transmitted light intensity by designing a system where the total retardation of the sample and the phase plate is integral times the wavelength of the measuring beam transmitted through the filter F1. Column 9, lines 1-5.

From the above, it is evident that Nagata et al. relates to a technology area and concerns that are radically different from Finarov and from those of rejected claims 45 and 79.

As described in the specification, pages 17-20, the configurations of Figs. 7A-7G of the present application are useful for deriving both the ellipsometric parameters and parameters of the measurement system. As noted on page 20, lines 10-13, the various configurations of Figs. 7A-7G may be arrived at by removing one or more of the elements 14, 106, 112, 26 from system 100 in Fig. 3.

LAW OFFICES OF
SKJERVEN MORRILL LLP
3 EMBARCADERO CENTER
SUITE 2800
SAN FRANCISCO, CA 94111
(415) 217-6000
FAX (415) 434-0646

System 100 in Fig. 3 may be used to derive the 25 harmonics described in the specification, where the harmonics are used for deriving ellipsometric parameters and parameters of the measurement system. Where less information is required for such purposes, not all 25 harmonics are necessary. In such event, simpler systems as illustrated in Figs. 7A-7H may be employed (page 17, lines 24-29 of the specification). Furthermore, removing such elements can have the beneficial effect of increasing the intensity of signal detected by the detector thereby enhancing the signal-to-noise ratio. Nagata and Finarov simply contain no description pertinent to such considerations.

In view of the very different purposes and considerations underlying claims 45 and 79 on the one hand and Nagata on the other, there is no reason or motivation for combining Nagata with Finarov and Chen as urged by the Examiner. As discussed above, there is no reason or motivation for combining Finarov and Chen to arrive at the self-calibrating feature of claim 37, and none of the references of record teaches or suggests claim 70. Adding Nagata to the mix does not help either. The reason provided by the examiner for the combination is that "removing or inserting the modulator or polarizer to obtain an output of the detector with respect to the angles of rotation of the polarizer or modulator." If this quoted statement means removing or inserting the modulator or polarizer in order to calibrate the angles of the modulator or polarizer, then Nagata simply contains no teaching or suggestion on this point whatsoever, nor do Finarov and Chen. On its face this statement appears to have little or no relevance with respect to the above-described functions and purpose of features in claims 45 and 79. If the examiner disagrees, it is respectfully requested that the examiner explain why this rationale has a bearing on combining the references in view of such functions and purpose.

This issue of providing evidence of teaching or motivation for combining references is clearly addressed by the Federal Circuit in the case In re Sang Su Lee, 277 F.3d 1338, 61 U.S.P.Q.2d 1430 (Fed. Cir. Jan. 2002). In such case, the Federal Circuit, quoted In re Dembiczak, 175 F.3d 994, 999, 50 U.S.P.Q.2d 1614, 1617 (Fed. Cir. 1999) opined as follows: "Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references." The Federal Circuit went on to state that "The need for specificity pervades this authority . . . . The Examiner's conclusory statements . . . do not adequately address the issue of motivation to combine. This factual

LAW OFFICES OF
SKJERVEN MORRILL LLP
3 EMBARCADERO CENTER
SUITE 2800
SAN FRANCISCO, CA 94111
(415) 217-6000
FAX (415) 434-0646

question of motivation is material to patentability, and could not be resolved on subjective belief and unknown authority."

Claims 54-56 and 58 are believed to be allowable since they depend from allowable claims.

Claims 80 and 82 are believed to be allowable since they depend from allowable claims.

Claims 88 and 89 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Finarov in view of U.S. Patent 3,880,524 to Dill et al. The rejection is respectfully traversed.

On page 13 of the office actin, the Examiner admits that a cylindrical objective is not provided by either Finarov or Dill but that to do so "would have been obvious to one having ordinary skill in the art since it has been held that the selection of a known material on the basis of its suitability for the intended use is within the level of ordinary skill of a worker in the art." Applicants respectfully disagree.

Claim 88 positively recites a limitation (cylindrical objective) which is not found in the prior art cited by the Examiner. The omission of such an element from the cited prior art cannot be overcome by broad and sweeping statements lacking any legal foundation therefor. It is respectfully requested that the Examiner clearly explain the rationale for this rejection so that it can be adequately responded to. It is believed that the Examiner has not provided adequate factual or legal basis for a *prima facie* case of obviousness of claim 88. It is submitted that the examiner's rejection of claim 88 is apparently based on subjective belief and unknown authority. Please see In re Sang Su Lee, discussed above.

Finarov and Dill do not teach or suggest the feature in claim 89 concerning the shape of the illuminated spot on the sample. From the above, it is believed that claims 88 and 89 are allowable over all art of record, including Finarov and Dill.

LAW OFFICES OF
SKJERVEN MORRILL LLP
3 EMBARCADERO CENTER
SUITE 2800
SAN FRANCISCO, CA 94111
(415) 217-6000
FAX (415) 434-0646

Claims 95, 97-101, 103-105, 112, 114-117, 119-121 and 123-125 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the '939 patent in view of U.S. Patent 3,904,293 to Gee. The rejection is respectfully traversed.

Claims 95 and 112 are believed to be allowable since they depend from allowable claims. They are further believed to be allowable on the strength of the limitations added by these claims. While the Examiner admits that the '939 patent fails to disclosure measurement of depolarization, the Examiner is of the opinion that Gee may be combined with the '939 patent to render these two claims obvious. Applicants respectfully disagree.

In order for two references to be properly combined, there must be a reason or motivation to do so. The '939 patent is silent as to depolarization and is concerned only with the measurement of sample properties. Gee, on the other hand, discloses only the measurement of depolarization and is devoid of teachings for measuring other properties of the sample. Thus, neither reference suggests the combination urged by the Examiner. Please see In re Sang Su Lee, discussed above. Furthermore, being able to measure both parameters of the sample as well as depolarization requires more than mechanically combining the two references, as urged by the Examiner. As clearly disclosed in pages 39 and 40 of the specification of the present application, the measurement instrument must be constructed so that adequate information can be obtained from the measurement in order to determine both the parameters of the sample and depolarization. In one embodiment, where the polarization state of the radiation is modulated at a frequency, the ellipsometer output provides signal components at 5 or more harmonics of such modulation frequency in order to provide adequate information. Alternatively, if one of the instruments used is self-calibrating, it may be used in conjunction with another instrument to provide one or more parameters of the sample as well as depolarization of radiation caused by the sample. It is noted that, for claims 95 and 112 dependent on claims 90 and 107, the instruments used are self-calibrating. None of this is taught or suggested by the '939 patent and Gee, either in combination or individually.

LAW OFFICES OF
SKJERVEN MORRILL LLP
3 EMBARCADERO CENTER
SUITE 2800
SAN FRANCISCO, CA 94111
(415) 217-6000
FAX (415) 434-0646

For some of the same reasons as those discussed above for claims 95 and 112, claims 97, 103, 114, 119 and 123-125 are also believed to be allowable. In addition, claims 103 and

119 contain the further limitation that the apparatus is self-calibrating in the sense that one or more parameters of the ellipsometer are also derived from the signals from which film thickness or thicknesses of and depolarization caused by the sample are also derived. This is clearly not taught or suggested by the '939 patent and Gee, either individually or in combination.

For substantially the same reasons as those explained above for claims 103 and 119, claim 98 is also believed to be allowable. While the '939 patent discloses the use of a calibration ellipsometer to provide signals for calibrating other measuring instruments, the '939 patent fails to disclose any features for self-calibration.

As for claims 99, 104, 115 and 120, the '939 patent fails to teach or suggest any capability to derive one or more parameters of the ellipsometer for self-calibration.

Claims 100, 105, 116 and 121 are believed to be allowable since they depend from allowable claims. Claims 101 and 117 are believed to be allowable since they depend from allowable claims.

Claims 17-36, 59-65 and 67-69 are provisionally rejected under the obviousness-type double patenting as being unpatentable over claims 17-36 of co-pending application number 09/298,007. Attached is a terminal disclaimer referring to the co-pending application so that the double patenting rejection is believed to have been obviated.

Applicants appreciate the indication that claims 50, 57, 81, 96, 102, 106, 113, 118 and 122 would be allowable if rewritten in independent form. This has not been done, since the claims upon which they depend are also believed to be allowable.

LAW OFFICES OF
SKJERVEN MORRILL LLP
3 EMBARCADERO CENTER
SUITE 2800
SAN FRANCISCO, CA 94111
(415) 217-6000
FAX (415) 434-0646

The terms "includes" and "including" in the claims have been replaced by "comprises" and "comprising." These amendments do not narrow the scope of the claims since the terms "includes" and "including" have been interpreted to be exclusive.

Claims 1-125 are presently pending in the application. Reconsideration of the rejections is respectfully requested, and an early indication of the allowability of all the claims is earnestly solicited.

EXPRESS MAIL LABEL NO:
EL873330530US

Respectfully submitted,

James S. Hsue
Attorney for Applicant(s)
Reg. No. 29,545

LAW OFFICES OF
SKJERVEN MORRILL LLP
3 EMBARCADERO CENTER
SUITE 2800
SAN FRANCISCO, CA 94111
(415) 217-6000
FAX (415) 434-0646

Version with markings to show changes made

1. (Amended) A method for measuring a sample, comprising:

providing a beam of radiation having a polarized component, and supplying radiation from the beam to the sample;

detecting radiation from the beam that has been modified by the sample;

modulating the polarization of the beam of radiation prior to its detection by means of a rotating phase modulator and a rotating polarizer; and

deriving from the detected radiation one or more ellipsometric parameters of the sample and one or more parameters of a system used in the providing, detecting or modulating step without restriction as to magnitude of the modulation.

2. The method of claim 1, wherein said modulating step modulates the beam before and after the beam is modified by the sample.

3. The method of claim 2, wherein said modulating step modulates the beam by rotating a first phase modulator or polarizer in an optical path of the beam before modification by the sample, and by rotating a second polarizer or phase modulator in an optical path of the beam after the beam has been modified by the sample.

4. The method of claim 3, wherein the modulating step rotates the modulator and polarizer at different speeds.

5. The method of claim 4, wherein the modulating step rotates the modulator or polarizer by more than 13 complete revolutions while the detecting step is detecting radiation from the beam.

6. The method of claim 4, wherein the modulating step rotates the modulator and polarizer at two speeds that form substantially a ratio of two integers, wherein each of the integers is indivisible by the other, while the detecting step is detecting radiation from the beam.

7. The method of claim 3, wherein the modulating step rotates the modulator and polarizer continually, or intermittently.

8. The method of claim 7, wherein the detecting step detects said radiation during the continual rotation of the modulator and polarizer, or when the modulator and polarizer are substantially stationary when they are rotated intermittently.

9. The method of claim 1, wherein said modulating step employs a rotating polarizer, rotating retarder, PEM or Pockels cell.

10. The method of claim 9, said rotating retarder being a Fresnel rhomb.

11. The method of claim 9, wherein said deriving derives system parameters related to said rotating polarizer, rotating retarder, PEM or Pockels cell.

12. (Amended) The method of claim 1, wherein said providing step ~~includes~~comprises passing unpolarized radiation through a fixed linear polarizer.

13. The method of claim 1, wherein said providing provides a beam of broadband radiation.

14. The method of claim 1, wherein radiation in said beam has wavelengths spanning a range from about 150 to about 830 nm.

15. (Amended) The method of claim 1, wherein said deriving derives parameters of the system ~~including~~comprising orientation of plane of said polarized component.

16. The method of claim 1, wherein said deriving derives parameters of the system such that said ellipsometric parameters are accurately derived without calibration of the system.

17. (Amended) A method for measuring a sample, comprising:

providing a beam of radiation;

passing the beam through a first fixed or rotating polarizing element so that a polarized radiation from the beam is supplied to the sample;

modulating radiation from the beam after modification by the sample by means of a ~~rotating~~ second rotating polarizing element to provide a modulated beam;

detecting radiation from the modulated beam;

polarizing the modulated beam before radiation from the modulated beam is detected by means of a fixed linear polarizer; and

deriving one or more ellipsometric parameters of the sample from the detected radiation.

18. The method of claim 17, further comprising rotating the first and second elements at different speeds.

19. The method of claim 18, wherein one of the two elements is rotated by more than 13 complete revolutions while the detecting step is detecting radiation from the beam.

20. The method of claim 18, wherein the two elements are rotated at two speeds that form substantially a ratio of two integers, wherein each of the integers is indivisible by the other, while the detecting step is detecting radiation from the beam.

21. The method of claim 17, wherein the two elements are rotated continually, or intermittently.

22. The method of claim 21, wherein the detecting step detects said radiation during the continual rotation of the elements, or when the elements are substantially stationary when they are rotated intermittently.

23. (Amended) The method of claim 17, wherein said providing step ~~includes~~comprises passing unpolarized radiation through a fixed linear polarizer.

24. The method of claim 17, further comprising passing the modulated beam through a fixed linear polarizer before its detection.

25. The method of claim 17, wherein said providing step provides a beam of broadband radiation.

26. The method of claim 17, wherein radiation in said beam has wavelengths spanning a range from about 150 to about 830 nm.

27. (Amended) The method of claim 17, said deriving step ~~including~~comprising deriving one or more parameters of the two elements, or of a system used in the providing, detecting or modulating step.

28. The method of claim 27, wherein said deriving step derives parameters of the system such that said ellipsometric parameters are accurately derived without calibration of the system or of the parameters of the two elements.

29. (Amended) A method for measuring a sample, comprising:

providing a beam of polarized radiation having a linearly polarized component and supplying radiation from the beam to the sample;

detecting radiation from the beam that has been modulated by the sample;

modulating radiation from the beam before modification by the sample ~~but before detection~~ by means of a rotating polarizing element;

passing the modulated radiation through a fixed or rotating linear polarizer prior to its detection; and

deriving one or more ellipsometric parameters of the sample from the detected radiation.

30. The method of claim 17, wherein the element is rotated continually, or intermittently.

31. The method of claim 30, wherein the detecting step detects said radiation during the continual rotation of the element, or when the element is substantially stationary when it is rotated intermittently.

32. (Amended) The method of claim 29, wherein said providing step ~~includes~~comprises passing unpolarized radiation through a fixed linear polarizer.

33. The method of claim 29, wherein said providing step provides a beam of broadband radiation.

34. The method of claim 33, wherein radiation in said beam has wavelengths spanning a range from about 150 to about 830 nm.

35. (Amended) The method of claim 29, said deriving step ~~including~~comprising- deriving one or more parameters of the ~~two~~ polarizing elements, ~~and of~~ the polarizer, or of a system used in the providing, detecting or modulating step.

36. The method of claim 35, wherein said deriving step derives parameters of the system such that said ellipsometric parameters are accurately derived without calibration of the system or of the parameters of the two elements.

37. (Amended) An apparatus for measuring a sample, comprising:

a source providing a beam of polarized radiation having a linearly polarized component;

optics applying radiation from the beam to the sample;

a detector detecting radiation from the beam that has been modified by the sample;

a modulating device modulating the polarization of the beam of radiation prior to its detection, said device ~~including~~comprising a rotating phase modulator and a rotating polarizer; and

a system deriving from the detected radiation one or more ellipsometric parameters of the sample and one or more parameters of the source, optics or modulating device without restriction as to magnitude of the phase modulation.

38. (Amended) The apparatus of claim 37, wherein said modulating device ~~includes~~comprises a first phase modulator or polarizer modulating the beam of radiation prior to application of the radiation therein to the sample, and a second polarizer or phase modulator modulating the radiation from the beam after it has been modified by the sample.

39. The apparatus of claim 38, said modulating device further comprising a rotator rotating the first modulator or polarizer in an optical path of the beam before modification by the sample, and rotating the second polarizer or modulator in an optical path for radiation from the beam after it has been modified by the sample.

40. The apparatus of claim 39, wherein the rotator rotates the modulator and polarizer at different speeds.

41. The apparatus of claim 40, wherein the rotator rotates the modulator or polarizer by more than 13 complete revolutions while the detector is detecting radiation from the beam.

42. The apparatus of claim 40, wherein the rotator rotates the modulator and polarizer at two speeds that form substantially a ratio of two integers, wherein each of the integers is indivisible by the other, while the detecting step is detecting radiation from the beam.

43. The apparatus of claim 39, wherein the rotator rotates the modulator and polarizer continually, or intermittently.

44. The apparatus of claim 43, wherein the detector detects said radiation during the continual rotation of the modulator and polarizer, or when the modulator and polarizer are substantially stationary when they are rotated intermittently.

45. The apparatus of claim 39, further comprising an instrument removing or inserting one of the modulator and polarizer in an optical path of the beam of radiation between the source and the detector.

46. The apparatus of claim 37, wherein said device comprises a rotating polarizer, rotating retarder, PEM or Pockels cell.

47. (Amended) The apparatus of claim 46, said rotating retarder ~~including~~comprising a Fresnel rhomb.

48. The apparatus of claim 46, wherein said system derives system parameters related to said rotating polarizer, rotating retarder, PEM or Pockels cell.

49. (Amended) The apparatus of claim 37, wherein said source ~~includes~~comprises a first fixed linear polarizer.

50. (Amended) The apparatus of claim 49, wherein said device ~~includes~~comprises a second fixed linear polarizer, wherein said system derives orientations of planes of said first and second linear polarizers.

51. The apparatus of claim 37, wherein said source provides a beam of broadband radiation.

52. The apparatus of claim 51, wherein radiation in said beam has wavelengths spanning a range from about 150 to about 830 nm.

53. The apparatus of claim 37, wherein said system derives parameters of the source, optics or modulating device such that said ellipsometric parameters are accurately derived without calibration of the optics or modulating device.

54. The apparatus of claim 37, further comprising an optical element diverting a portion of the radiation after modulation by the device to a position sensitive detector for sensing tilt or height of the sample.

55. The apparatus of claim 54, further comprising an objective relaying said modulated radiation from a spot on the sample illuminated by the beam to said detector, said position sensitive detector being placed at a focal length of the objective away from the objective, to detect tilt of the sample.

56. The apparatus of claim 54, further comprising an objective relaying said modulated radiation from a spot on the sample illuminated by the beam to said detector, said position sensitive detector being placed to detect the spot at a desired height of the sample.

57. The apparatus of claim 54, said optical element comprising a diffraction grating or two pellicle beam splitters.

58. The apparatus of claim 54, said optical element diverting a first portion of the radiation after modulation by the device to a first position sensitive detector for

sensing tilt of the sample and a second portion of the radiation after modulation by the device to a second position sensitive detector for sensing height of the sample.

59. An apparatus for measuring a sample, comprising:

a source providing a beam of radiation;

a first fixed or rotating polarizing element modulating radiation in the beam so that polarized radiation from the beam is supplied to the sample;

a second rotating polarizing element modulating radiation from the beam after modification by the sample to provide a modulated beam;

a detector detecting radiation from the modulated beam;

a fixed linear polarizer polarizing the modulated beam before radiation from the modulated beam is detected by the detector; and

a system deriving one or more ellipsometric parameters of the sample from the detected radiation.

60. The apparatus of claim 59, said first polarizing element being a rotating polarizing element, further comprising a rotator rotating the first and second elements at different speeds.

61. The apparatus of claim 59, wherein the rotator rotates one of the two elements by more than 13 complete revolutions while the detector is detecting radiation from the beam.

62. The apparatus of claim 60, wherein the rotator rotates the two elements at two speeds that form substantially a ratio of two integers, wherein each of the integers is indivisible by the other, while the detecting step is detecting radiation from the beam.

63. The apparatus of claim 59, further comprising a rotator rotating the two elements continually, or intermittently.

64. The method of claim 63, wherein the detector detects said radiation during the continual rotation of the elements, or when the elements are substantially stationary when they are rotated intermittently.

65. (Amended) The apparatus of claim 59, wherein said source ~~includes~~comprises a fixed linear polarizer.

66. Cancelled.

67. The apparatus of claim 59, whether comprising an optical element diverting a portion of the modulated beam to a position sensitive detector for sensing tilt or height of the sample.

~~73~~68. (Amended) The apparatus of claim 72, said optical element comprising a diffraction grating or two pellicle beam splitters.

~~74~~69. (Amended) The apparatus of claim 72, said optical element diverting a first portion of the modulated beam to a first position sensitive detector for sensing tilt of the sample and a second portion of the modulated beam to a second position sensitive detector for sensing height of the sample.

~~75~~70. (Amended) An apparatus for measuring a sample, comprising:

a source providing a beam of polarized radiation having a linearly polarized component;

a detector detecting radiation from the beam that has been modulated by the sample;

a rotating polarizing element modulating radiation in the beam before modification by the sample~~ but before detection~~;

a fixed or rotating linear polarizer polarizing radiation modulated by the element and the sample prior to detection by the detector; and

a system deriving one or more ellipsometric parameters of the sample from the detected radiation.

~~76~~71. (Amended) The apparatus of claim ~~75~~70, further comprising a rotator rotating the element continually, or intermittently.

~~77~~72. (Amended) The method of claim ~~76~~71, wherein the detector detects said radiation during the continual rotation of the elements, or when the elements are substantially stationary when they are rotated intermittently.

~~78~~73. (Amended) The apparatus of claim ~~75~~70, wherein said source ~~includes~~comprises a fixed linear polarizer.

~~79~~74. (Amended) The apparatus of claim ~~75~~70, further comprising a fixed linear polarizer polarizing the modulated beam before radiation from the modulated beam is detected by the detector.

~~80~~75. (Amended) The apparatus of claim ~~75~~70, wherein said source provides a beam of broadband radiation.

~~81~~76. (Amended) The apparatus of claim ~~80~~75, wherein radiation in said beam has wavelengths spanning a range from about 150 to about 830 nm.

~~82~~77. (Amended) The apparatus of claim ~~75~~70, said system deriving one or more parameters of the element, the polarizer or the source.

~~83~~78. (Amended) The apparatus of claim ~~82~~77, wherein said system derives parameters of the element, the polarizer, the source and the detector such that said ellipsometric parameters are accurately derived without calibration of the two elements.

~~84~~79. (Amended) The apparatus of claim ~~75~~70, further comprising an instrument removing or inserting one of the two elements.

~~85~~80. (Amended) The apparatus of claim ~~75~~70, further comprising an optical element diverting a portion of the modulated beam to a position sensitive detector for sensing tilt or height of the sample.

~~86~~81. (Amended) The apparatus of claim ~~85~~80, said optical element comprising a diffraction grating or two pellicle beam splitters.

~~87~~82. (Amended) The apparatus of claim ~~85~~80, said optical element diverting a first portion of the modulated beam to a first position sensitive detector for sensing tilt of the sample and a second portion of the modulated beam to a second position sensitive detector for sensing height of the sample.

~~88~~83. (Cancelled) An apparatus for measuring a sample, comprising:

a source providing a beam of radiation;

optics applying radiation from the beam to the sample;

a detector detecting radiation from the beam that has been modified by the sample;

a modulating device modulating the beam of radiation prior to its detection; and

an optical element diverting a portion of the beam of radiation after modulation by the device to a position sensitive detector for sensing tilt or height of the sample.

~~89~~84. (Cancelled) ~~The apparatus of claim 88, further comprising an objective relaying radiation modulated by the device from a spot on the sample illuminated by the beam to said detector, said position sensitive detector being placed at a focal length of the objective away from the objective, to detect tilt of the sample.~~

~~90~~85. (Cancelled) ~~The apparatus of claim 88, further comprising an objective relaying radiation modulated by the device from a spot on the sample illuminated by the beam to said detector, said position sensitive detector being placed to detect the spot at a desired height of the sample.~~

~~91~~86. (Cancelled) ~~The apparatus of claim 88, said optical element comprising a diffraction grating or two pellicle beam splitters.~~

~~92~~87. (Cancelled) ~~The apparatus of claim 88, said optical element diverting a first portion of the radiation after modulation by the device to a first position sensitive detector for sensing tilt of the sample and a second portion of the radiation after modulation by the device to a second position sensitive detector for sensing height of the sample.~~

~~93~~88. (Amended) An apparatus for measuring a sample, comprising:

a source providing a beam of radiation;

optics ~~including~~comprising a cylindrical objective for focusing radiation from the beam to the sample in a direction away from a normal direction to the sample;

a detector detecting radiation from the beam that has been modified by the sample;

a modulating device modulating the beam of radiation prior to its detection; and

a system deriving a reflectance or one or more ellipsometric parameters of the sample from the detected radiation.

~~94~~89. (Amended) The apparatus of claim ~~93~~88, said cylindrical objective being such that radiation from the beam is focused to a substantially circular spot on the sample.

~~95~~90. (Amended) A method for measuring a sample, comprising:

measuring the sample by means of an ellipsometer to provide first signals;

deriving from information in the first signals one or more parameters of the sample and one or more parameters of the ellipsometer;

measuring the sample by means of an optical measurement instrument to provide second signals; and

deriving from information in the first and second signals one or more parameters of the sample and one or more parameters of the ~~ellipsometer~~ instrument to improve accuracy of measurement.

~~96~~91. (Amended) The method of claim ~~95~~90, said sample being an internal reference sample of the ellipsometer, said method further comprising calibrating the instrument using the derived parameter(s) of the sample.

~~97~~92. (Amended) The method of claim ~~95~~90, wherein said instrument is a spectroreflectometer, polarimeter, or ellipsometer, said method further comprising calibrating the instrument using the derived parameter(s) of the sample.

~~98~~93. (Amended) The method of claim ~~95~~90, wherein said measuring step by means of the ellipsometer ~~includes~~comprises:

providing a beam of radiation having a polarized component, and supplying radiation from the beam to the sample;

detecting radiation from the beam that has been modified by the sample;

modulating the polarization of the beam of radiation prior to its detection; and

deriving one or more ellipsometric parameters of the sample and one or more parameters of the ellipsometer.

~~99~~94. (Amended) The method of claim ~~98~~93, wherein said modulating modulates the polarization of the beam of radiation without restriction as to magnitude of the modulation.

~~100~~95. (Amended) The method of claim ~~95~~90, wherein said deriving derives film thickness information of the sample and depolarization of radiation caused by the sample.

~~101~~96. (Amended) The method of claim ~~100~~95, said first output signals indicating sample characteristics over a spectrum of wavelengths, wherein said deriving derives depolarization of radiation caused by the sample over the spectrum.

~~102~~97. (Amended) A method for measuring a sample, comprising:

measuring the sample by means of an ellipsometer to provide first signals;

measuring the sample by means of an optical measurement instrument to provide second signals; and

deriving from the first and second signals information related to film thickness(es) of and depolarization caused by the sample.

~~103~~98. (Amended) The method of claim ~~102~~97, further comprising, prior to measuring the sample:

measuring another sample by means of the ellipsometer to provide third signals; and

deriving from the third signals one or more parameters of the another sample and one or more parameters of the ellipsometer to calibrate the ellipsometer.

~~104~~99. (Amended) The method of claim ~~103~~98, wherein said measuring step of another sample by means of the ellipsometer ~~includes~~comprises:

providing a beam of radiation having a polarized component, and supplying radiation from the beam to the another sample;

detecting radiation from the beam that has been modified by the another sample;

modulating the polarization of the beam of radiation prior to its detection; and

deriving one or more ellipsometric parameters of the another sample and one or more parameters of the ellipsometer.

~~105~~100. (Amended) The method of claim ~~104~~99, wherein said modulating modulates the polarization of the beam of radiation without restriction as to magnitude of the modulation.

~~106~~101. (Amended) The method of claim ~~102~~97, wherein said deriving also derives parameters of the ellipsometer.

~~107~~102. (Amended) The method of claim ~~102~~97, said first signals indicating sample characteristics over a spectrum of wavelengths, wherein said deriving derives depolarization of radiation caused by the sample over the spectrum.

~~108~~103. (Amended) A method for measuring a sample, comprising:

measuring the sample by means of an ellipsometer to provide first signals; and

deriving from the first signals information related to film thickness(es) of and depolarization caused by the sample and one or more parameters of the ellipsometer to improve accuracy of measurement.

~~109~~104. (Amended) The method of claim ~~108~~103, wherein said measuring step by means of the ellipsometer ~~includes~~comprises:

providing a beam of radiation having a polarized component, and supplying radiation from the beam to the sample;

detecting radiation from the beam that has been modified by the sample;

modulating the polarization of the beam of radiation prior to its detection; and

deriving one or more ellipsometric parameters of the sample and one or more parameters of the ellipsometer.

~~110~~105. (Amended) The method of claim ~~109~~104, wherein said modulating modulates the polarization of the beam of radiation without restriction as to magnitude of the modulation.

~~111~~106. (Amended) The method of claim ~~108~~103, said first output signals indicating sample characteristics over a spectrum of wavelengths, wherein said deriving derives depolarization of radiation caused by the sample over the spectrum.

~~112~~107. (Amended) An apparatus for measuring a sample, comprising:

an ellipsometer measuring the sample to provide first signals;

a system deriving from information in the first signals one or more parameters of the sample and one or more parameters of the ellipsometer; and

an optical measurement instrument measuring the sample to provide second signals;~~and~~

wherein thea system ~~deriving~~ derives from information in the first and second signals one or more parameters of the sample and one or more parameters of the ~~ellipsometer~~ instrument to improve accuracy of measurement.

~~113~~108. (Amended) The apparatus of claim ~~112~~107, said sample being an internal reference sample of the ellipsometer.

~~114~~109. (Amended) The apparatus of claim ~~112~~107, wherein said instrument is a spectroreflectometer, polarimeter, or ellipsometer, wherein said sample is also a calibration sample of the instrument.

~~115~~110. (Amended) The apparatus of claim ~~112~~107, wherein said ellipsometer ~~includes~~comprises:

a source providing to the sample a beam of radiation having a polarized component;

a detector detecting radiation from the beam that has been modified by the sample to provide an output;

a modulator modulating the polarization of the beam of radiation prior to its detection; and

a processor deriving from the output one or more ellipsometric parameters of the sample and one or more parameters of the ellipsometer.

~~116~~111. (Amended) The apparatus of claim ~~115~~110, wherein said modulator modulates the polarization of the beam of radiation without restriction as to magnitude of the modulation.

~~117~~112. (Amended) The apparatus of claim ~~115~~110, wherein said processor derives film thickness information of the sample and depolarization of radiation caused by the sample.

~~118~~113. (Amended) The apparatus of claim ~~117~~112, said first output signals indicating sample characteristics over a spectrum of wavelengths, wherein said processor derives depolarization of radiation caused by the sample over the spectrum.

~~119~~114. (Amended) An apparatus for measuring a sample, comprising:

an ellipsometer measuring the sample to provide first signals;

an optical measurement instrument measuring the sample to provide second signals; and

a system deriving from the first and second signals information related to film thickness(es) of and depolarization caused by the sample.

~~120~~115. (Amended) The apparatus of claim ~~119~~114, wherein said ellipsometer ~~includes~~comprises:

a source providing a beam of radiation having a polarized component to the sample;

a detector detecting radiation from the beam that has been modified by the sample;

a modulator modulating the polarization of the beam of radiation prior to its detection; and

a processor deriving one or more ellipsometric parameters of the sample and one or more parameters of the ellipsometer.

~~121~~116. (Amended) The apparatus of claim ~~120~~115, wherein said modulator modulates the polarization of the beam of radiation without restriction as to magnitude of the modulation.

~~122~~117. (Amended) The apparatus of claim ~~119~~114, wherein said deriving means derives parameters related to the ellipsometer.

~~123~~118. (Amended) The apparatus of claim ~~122~~117, said first output signals indicating sample characteristics over a spectrum of wavelengths, wherein said deriving means derives depolarization of radiation caused by the sample over the spectrum.

~~124~~119. (Amended) An apparatus for measuring a sample, comprising:

an ellipsometer measuring the sample to provide first signals; and

a system deriving from the first signals information related to film thickness(es) of and depolarization caused by the sample and one or more parameters of the ellipsometer to improve accuracy of measurement.

~~125~~120. (Amended) The apparatus of claim ~~124~~119, wherein said ellipsometer ~~includes~~comprises:

a source providing a beam of radiation having a polarized component to the sample;

a detector detecting radiation from the beam that has been modified by the sample;

a modulator modulating the polarization of the beam of radiation prior to its detection; and

a processor deriving one or more ellipsometric parameters of the sample and one or more parameters of the ellipsometer.

~~126~~121. (Amended) The apparatus of claim ~~125~~120, wherein said modulator modulates the polarization of the beam of radiation without restriction as to magnitude of the modulation.

~~127~~122. (Amended) The apparatus of claim ~~124~~119, said first output signals indicating sample characteristics over a spectrum of wavelengths, wherein said deriving means derives depolarization of radiation caused by the sample over the spectrum.

~~128~~123. (Amended) A method for measuring a sample, comprising:

measuring the sample by means of an ellipsometer supplying radiation to the sample and detecting said radiation after modification by the sample to provide first signals, wherein said measuring ~~includes~~comprises modulating the radiation supplied to the sample at a frequency by means of a rotating polarizer, said first signals ~~including~~comprising components at more than five harmonics of said frequency; and

deriving from the first signals information related to film thickness(es) of and depolarization caused by the sample.

~~129~~124. (Amended) An apparatus for measuring a sample, comprising:

an ellipsometer measuring the sample to provide output signals; and

a system deriving from the signals information related to film thickness(es) of and depolarization caused by the sample, said ellipsometer comprising at least one rotating polarizer.

~~130~~125. (Amended) An apparatus for measuring a sample, comprising:

an ellipsometer measuring the sample to provide output signals; and

a system deriving from the signals information related to film thickness(es) of and depolarization caused by the sample, said ellipsometer comprising:

a source supplying radiation having a polarized component in a first optical path to the sample;

a first phase modulator in the first optical path modulating the phase of the polarized component;

a detector detecting radiation along a second optical path, where the radiation detected by the detector is supplied by the source and modified by the sample; and

a second phase modulator in the second optical path modulating the phase of the polarized component.